Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-20 (Canceled).

Claim 21 (Currently Amended): A cold cathode discharge device used as a discharge lamp, comprising:

an envelope filled with a discharge gas therein;

a fluorescent film coated on an inner surface of the envelope;

a cold cathode comprising a supporting member of conductive material and an electron emitter with an electron-emitting surface configured to emit electrons and supported by the supporting member, the electron emitter being positioned in the envelope; and

the discharge gas ~~comprises~~ comprising a rare gas and mercury,

wherein the electron emitter comprises a mixed phase of diamond phase and conductive carbon phase, the diamond phase comprises granular bodies doped with at least one element selected from the group consisting of phosphorus, sulfur, and boron, and the conductive carbon phase is formed between the granular bodies and extends in the form of a channel between the supporting member and the electron-emitting surface in the electron emitter.

Claim 22 (Previously Presented): The cold cathode discharge device as stated in Claim 21, wherein the discharge gas comprises xenon.

Claim 23 (Canceled).

Claim 24 (Previously Presented): The cold cathode discharge device as stated in Claim 21, wherein the conductive carbon phase comprises graphite or amorphous carbon layers.

Claim 25 (Previously Presented): The cold cathode discharge device as stated in Claim 21, wherein the electron-emitter surface is made rough, and the conductive carbon phase is exposed on the electron emitting surface.

Claim 26 (Previously Presented): The cold cathode discharge device as stated in Claim 21, wherein the envelope is an elongated envelope having the supporting member in both end regions thereof.

Claim 27 (Canceled).

Claim 28 (Currently Amended): A cold cathode discharge device used as a discharge lamp, comprising:

an envelope filled with a discharge gas therein;

a fluorescent film coated on an inner surface of the envelope;

a cold cathode comprising a supporting member of conductive material and an electron emitter with an electron-emitting surface configured to emit electrons and supported by the supporting member, the electron emitter being positioned in the envelope; and

the discharge gas comprises a gas including an element with a principal radiation peak of 200 nanometers or less in wavelength,

wherein the electron emitter comprises a mixed phase of diamond phase and conductive carbon phase, the diamond phase comprises granular bodies doped with at least one element selected from the group consisting of phosphorus, sulfur, and boron, and the conductive carbon phase is formed between the granular bodies and extends in the form of a channel between the supporting member and the electron-emitting surface in the electron emitter.

Claim 29 (Previously Presented): The cold cathode discharge device as stated in Claim 28, wherein the discharge gas comprises xenon.

Claim 30 (Canceled).

Claim 31 (Previously Presented): The cold cathode discharge device as stated in Claim 28, wherein the conductive carbon phase comprises graphite or amorphous carbon layers.

Claim 32 (Previously Presented): The cold cathode discharge device as stated in Claim 28, wherein the electron-emitting surface is made rough, and the conductive carbon phase is exposed on the electron emitting surface.

Claim 33 (Previously Presented): The cold cathode discharge device as stated in Claim 28, wherein the envelope is an elongated envelope having the supporting member in both end regions thereof.

Claim 34 (Canceled).